

NAIL STAPLER

Cross Reference

The present application is a continuation-in-part application of US Patent Application No. 10/227373.

Field of Invention

The present invention relates to a nail stapler.

Background of Invention

Referring to Figures 10 and 11, a conventional nail stapler includes a gun 10 and a magazine 16. The gun 10 includes a shell 11, a solenoid 12 put in the shell 11, a mandrel 13 put in the shell 11, a spring 14 compressed between an end of the solenoid 12 and a head of the mandrel 13 and a hammer 15 secured to the mandrel 13. When activated, the solenoid 12 attracts the mandrel 13 and the hammer 15 so as to punch a staple nail 17 from the magazine 16 through an outlet 18. When the magnetic force is gone, the mandrel 13 is returned by means of the spring 14. However, the hammer 13 may hit and rebound from a portion of the shell 11 so as to punch a staple by mistake as shown in Figure 6.

The present invention is therefore intended to obviate or at least alleviate the problems encountered in prior art.

1 **Summary of Invention**

2 It is the primary objective of the present invention to provide a nail
3 stapler with a security device for preventing stapling by mistake.

4

5 According to the present invention, a nail stapler includes a magazine for
6 containing nails and a gun for shooting the nails from the magazine.

7 The gun includes a shell, a solenoid put in the shell, a mandrel put in the
8 shell to be attracted from an original position to a punching position by
9 means of the solenoid, a hammer secured to the mandrel and inserted
10 through the solenoid, a spring for moving the mandrel to the original
11 position from the punching position against the solenoid and a security
12 device put in the shell for slowing down the mandrel when the mandrel is
13 moved to the original position from the punching position by means of
14 the spring.

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16 Other objects, advantages, and novel features of the invention will
17 become more apparent from the following detailed description when
18 taken in conjunction with the attached drawings.

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20 **Brief Description of Drawings**

21 The present invention will be described through detailed illustration of
22 several embodiments referring to the drawings.

23

24 Figure 1 is an exploded view of a nail stapler according to a first
25 embodiment of the present invention.

1 Figures 2~4 are cross-sectional views of the nail stapler of Figure 1 in
2 different positions.

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4 Figure 5 is a cross-sectional view of a nail stapler according to a second
5 embodiment of the present invention.

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7 Figure 6 is an exploded view of a nail stapler according to a third
8 embodiment of the present invention.

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10 Figures 7 and 8 are cross-sectional views of the nail stapler of Figure 6 in
11 different positions.

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13 Figure 9 is a cross-sectional view of a nail stapler according to a fourth
14 embodiment of the present invention.

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16 Figure 10 and 11 are cross-sectional views of a conventional nail stapler
17 in different positions.

18

19 **Detailed Description of Embodiments**

20 Referring to Figures 1-4, a nail stapler includes a gun 20 (partially shown)
21 and a magazine 27. The gun 20 includes a shell 21, a solenoid 30 and a
22 mandrel 40.

23

24 The shell 21 consists of two halves. A retainer 24 is formed on an
25 internal face of each halve of the shell 21. As the halves of the shell 21

1 are assembled, the retainers 24 become a partition between an upper
2 space 22 and a lower space 23. Each retainer 24 is crescent so that the
3 retainers 24 define an aperture 26 as they are assembled.

4
5 The solenoid 30 defines an axial channel 31. The solenoid 30 is put in
6 the shell 21. A pad 32 is positioned between the solenoid 30 and a
7 portion of the shell 21.

8
9 A hammer 41 is secured to a lower end of the mandrel 40. The hammer
10 41 is inserted in the spring 43 and the axial channel 31 of the solenoid 30.
11 The mandrel 40 is inserted in the spring 43.

12
13 A security device according to a first embodiment of the present invention
14 is shown in Figures 1-4. The security device includes a cup 44 and an
15 insert 50. The cup 44 includes an annular flange 49 formed about an
16 upper end and a cavity 42 defined therein. The cup 44 is secured to an
17 upper end of the mandrel 40. The spring 43 is compressed between an
18 upper end of the solenoid 30 and the annular flange 49.

19
20 The insert 50 includes a head 52 and a body 58 extending from the head
21 52 and including a reduced diameter. Two rings 53 are put in two
22 grooves 51 defined in the body 58. The insert 50 is put in the shell 21.
23 The head 52 is put in the upper space 22 while the body 58 is put in the
24 lower space 23 through the aperture 26 so as to retain the insert 50 in
25 position.

1 Referring to Figure 2, when activated, the solenoid 30 attracts the
2 mandrel 40. Therefore, the hammer 41 is moved downwards so as to
3 punch a staple or nail 29 from a magazine 28 through an outlet 27. The
4 spring 43 is compressed.

5
6 Referring to Figure 3, when not actuated, the solenoid 30 releases the
7 mandrel 40. The mandrel 40 is moved to its original position by means
8 of the spring 43.

9
10 Referring to Figure 4, as the mandrel 40 reaches its original portion, the
11 rings 53 are inserted in the cavity 42. The rings 53 contact the wall of
12 the cavity 42. Friction between the rings 53 and the wall of the cavity
13 42 slows down the cup 44 and therefore the mandrel 40. Thus, the
14 mandrel 40 does not rebound from the retainer 24 and does not punch a
15 staple or nail 29 by mistake.

16
17 Figure 5 shows a nails stapler according to a second embodiment of the
18 present invention. The second embodiment is identical to the first
19 embodiment except for including bigger and more elastic rings 54 instead
20 of the rings 53.

21
22 Figures 6-8 show a nail stapler according to a third embodiment of the
23 present invention is shown. The third embodiment is identical to the
24 first embodiment except for three things. Firstly, a cap 50' is used
25 instead of the insert 50. The cap 50' includes an annular groove 55

1 defined in a periphery and a space 56 defined therein. The annular
2 groove 55 receives the retainers 24 so as to keep the cap 50' in position in
3 the shell 21. The cap 50' is like the cup 44 in function. Secondly,
4 instead of the cup 44, an insert 44' is secured to the mandrel 40. The
5 insert 44' includes two annular grooves 45 receiving two rings 47. The
6 insert 44' is like the insert 50 in function. Thirdly, the annular flange 49
7 is formed on the mandrel 40 instead of on the cup 44.

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9 Figure 9 shows a security device according to a fourth embodiment of the
10 present invention. The fourth embodiment is identical to the third
11 embodiment except for including bigger and more elastic rings 48.

12
13 The present invention has been described via detailed illustration of four
14 embodiments. Those skilled in the art can derive variations from the
15 embodiments without departing from the scope of the present invention.
16 Hence, the embodiments shall not limit the scope of the present invention
17 defined in the claims.